

LISTING OF THE CLAIMS

1 (currently amended): A highly impact-resistant steel pipe characterized in that; the steel pipe is a water quenched steel pipe, wherein water quenched means cooled at a cooling rate of 6,000°C/min or higher with cooling water having a temperature of 35°C or lower, and the steel pipe consists essentially of, in mass, 0.19 to 0.35% C, 0.10 to ~~0.30~~ 0.27% Si, where the Si amount is controlled in a range from (Mn/8 - 0.07) to (Mn/8 + 0.07), 0.5 to 1.60% Mn, not more than 0.025% P, not more than 0.01% S, 0.010 to 0.050% Al, 2 to 35 ppm B, 0.005 to 0.05% Ti, not more than 0.5% Cr, not more than 0.5% Mo, and the balance being Fe and unavoidable impurities, and the tensile strength TS of said steel pipe is 1,700 MPa or more, and YR thereof, said YR being the ratio of the 0.1%-proof stress YS to said tensile strength TS (YS/TS), is 72% or less.

2 (currently amended): A highly impact-resistant steel pipe characterized in that; the steel pipe is a water quenched steel pipe, wherein water quenched means cooled at a cooling rate of 6,000°C/min or higher with cooling water having a temperature of 35°C or lower, and the steel pipe consists essentially of, in mass, 0.19 to 0.35% C, 0.10 to ~~0.30~~ 0.27% Si, where the Si amount is controlled in a range from (Mn/8 - 0.07) to (Mn/8 + 0.07), 0.5 to 1.60% Mn, not more than 0.025% P, not more than 0.01% S, 0.010 to 0.050% Al, 2 to 35 ppm B, 0.005 to 0.05% Ti, not more than 0.5% Cr, not more than 0.5% Mo, and the balance being Fe and unavoidable impurities, and the tensile strength TS of said steel pipe is 1,800 MPa or more, and YR thereof, said YR being the ratio of the 0.1%-proof stress YS to said tensile strength TS (YS/TS), is 70% or less.

3 (currently amended): A highly impact-resistant steel pipe characterized in that; the steel pipe is a water quenched steel pipe, wherein water quenched means cooled at a cooling rate of 6,000°C/min or higher with cooling water having a temperature of 35°C or

lower, and the steel pipe consists essentially of, in mass, 0.19 to 0.35% C, 0.10 to ~~0.30~~ 0.27% Si, where the Si amount is controlled in a range from (Mn/8 - 0.07) to (Mn/8 + 0.07), 0.5 to 1.60% Mn, not more than 0.025% P, not more than 0.01% S, 0.010 to 0.050% Al, 2 to 35 ppm B, 0.005 to 0.05% Ti, not more than 0.5% Cr, not more than 0.5% Mo, and the balance being Fe and unavoidable impurities, and the tensile strength TS of said steel pipe is 1,900 MPa or more, and YR thereof, said YR being the ratio of the 0.1%-proof stress YS to said tensile strength TS (YS/TS), is 68% or less.

4 (currently amended): A highly impact-resistant steel pipe characterized in that; the steel pipe is a water quenched steel pipe, wherein water quenched means cooled at a cooling rate of 6,000°C/min or higher with cooling water having a temperature of 35°C or lower, and the steel pipe consists essentially of, in mass, 0.19 to 0.35% C, 0.10 to ~~0.30~~ 0.27% Si, where the Si amount is controlled in a range from (Mn/8 - 0.07) to (Mn/8 + 0.07), 0.5 to 1.60% Mn, not more than 0.025% P, not more than 0.01% S, 0.010 to 0.050% Al, 2 to 35 ppm B, 0.005 to 0.05% Ti, not more than 0.5% Cr, not more than 0.5% Mo, and the balance being Fe and unavoidable impurities, and the tensile strength TS of said steel pipe is 2,000 MPa or more, and YR thereof, said YR being the ratio of the 0.1%-proof stress YS to said tensile strength TS (YS/TS), is 66% or less.

Claim 5: (canceled).

6 (original): A highly impact-resistant steel pipe according to any one of claims 1 to 4, characterized in that the dislocation density of said steel pipe is in the range from 10^{10} to $10^{14}/\text{mm}^{-2}$.

Claim 7: (canceled).

8 (previously presented): A highly impact-resistant steel pipe according to any one of claims 1 to 4, characterized in that the steel of said steel pipe further consists essentially of, in mass, one or more components selected from among the group of 0.005 to 0.050% Nb, 0.005 to 0.070% V, 0.005 to 0.5% Cu, 0.1 to 0.5% Mo, 0.1 to 0.5% Ni, not more than 0.01% Ca, and not more than 0.1% rare earth metals (REMs).

9 (previously presented): A highly impact-resistant steel pipe according to any one of claims 1 to 4, characterized in that 95% or more of the microstructure of said steel pipe is martensite.

10 (previously presented): A highly impact-resistant steel pipe according to any one of claims 1 to 4, characterized in that said steel pipe has a round or square sectional shape.

Claims 11-14: (canceled).

15 (previously presented): A highly impact-resistant steel pipe according to any one of claims 1 to 4, wherein the maximum content of Mn is 1.44%.

16 (previously presented): A highly impact-resistant steel pipe according to any one of claims 1 to 4, wherein the maximum content of Cr is 0.15%.

17 (new): A method for producing a highly impact-resistant water quenched steel pipe comprising:

providing a steel pipe fabricated from a steel consisting essentially of, in mass, 0.19 to 0.35% C, 0.10 to 0.27% Si, where the Si amount is controlled in a range from $(\text{Mn}/8 - 0.07)$ to $(\text{Mn}/8 + 0.07)$, 0.5 to 1.60 % Mn, not more than 0.025% P, not more than 0.01% S, 0.010 to 0.050% Al, 2 to 35 ppm B, 0.005 to 0.05% Ti, not more than 0.5% Cr, not more than 0.5% Mo, and the balance being Fe and unavoidable impurities;

induction heating said steel pipe to a temperature of 900°C or higher;

water quenching the induction heated steel pipe at the temperature of 900°C or higher at a cooling rate of 6,000°C/min or higher with cooling water having a temperature of 35°C or lower; said water quenching causing instantaneous transformation of austenite to martensite;

wherein 95% or more of the steel microstructure of the steel pipe is transformed into martensite by said induction heating followed by said water quenching and austenite grain size number of the steel of the steel pipe prior to water quenching is # 6 or more;

thereby providing a water quenched steel pipe having a tensile strength TS of 1700 MPa or more and YR thereof, said YR being a ratio of 0.1% - proof stress YS to said tensile strength TS (YS/TS), is 72% or less.

18 (new): A method for producing a highly impact-resistant water quenched steel pipe according to claim 17, further comprising providing the water quenched steel pipe with TS of 1,800 MPa or more and YR of 70% or less.

19 (new): A method for producing a highly impact-resistant water quenched steel pipe according to claim 17, further comprising providing the water quenched steel pipe with TS of 1,900 MPa or more and YR of 68% or less.

20 (new): A method for producing a highly impact-resistant water quenched steel pipe according to claim 17, further comprising providing the water quenched steel pipe with TS of 2,000 MPa or more and YR of 66% or less.

21 (new): A method for producing a highly impact-resistant water quenched steel pipe according to claim 17, further comprising water quenching the induction heated steel pipe at a temperature of 900°C or higher at a cooling rate of 9,000°C/min or higher.

22 (new): A method for producing a highly impact-resistant water quenched steel pipe according to claim 17, further comprising said water quenching generating an expansion of the steel pipe of about 7 to 8% due to transformation strain.